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<p>(54) Title: INTEGRATED PRODUCT AND PROCESS FOR MASS CUSTOMIZATION OF GOODS ONE ITEM AT A TIME</p> <div data-bbox="453 1167 1227 1656" data-label="Diagram"> <pre> graph LR 3((3)) --- DI[DESIGN INTERFACE 5] DI --- 6[web-based product customization system 6] 6 --- MF[MANUFACTURING FACILITY 7] </pre> </div> <p>(57) Abstract</p> <p>An integrated product and process for mass customization of goods one item at a time and, more specifically, an integrated product and process for the mass customization of headwear one item at a time over the World Wide Web (6). The customized good production system (3) may be broken up into a web-based product customization system (5) and an integrated product manufacturing plant (7). The design system (5) may show actual pictures of the designed good, as the design choices are made by the user. Completion of the design phase of the customized good production process may trigger the generation of a specific ticket or other request at an integrated factory (7) that produces appropriate goods. The customized good may be built from raw materials according to the user's specifications.</p>		

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INTEGRATED PRODUCT AND PROCESS FOR MASS CUSTOMIZATION OF GOODS ONE ITEM AT A TIME

This application claims the benefit of the earlier filing date of
provisional application number 60/128,427 filed on April 1, 1999.

FIELD OF THE INVENTION

The present invention generally relates to an integrated product and
process for mass customization of goods one item at a time and, more specifically, to
an integrated product and process for employing the World Wide Web in the mass
customization of headwear one item at a time.

BACKGROUND OF THE INVENTION

In one traditional method of producing goods, a designer of the good
may establish relationships with one or more manufacturing factories, and the
designer may order large lots of a fairly standardized good at regular intervals.
Because the design and manufacturing processes are not integrated -- and may be
located at geographically distant places -- there is often much overhead involved in
terms of both time and expense. In the apparel industry, for example, the designer
may need to order the various apparel varieties at least six to nine months in advance
of sale because of the large quantity and need to procure various fabrics and other

materials. However, in the time between the designer placing an order and the manufacturer delivering the apparel, fashion styles and tastes may change several times, and the apparel that was ordered may no longer be desired by the public.

An improved process may be more customized to an individual user. Rather than trying to "guess" what consumer's tastes will be in the future, a manufacturer could customize a product to a customer's design preferences. For example, an apparel manufacturer may measure the customer's physical dimensions, allow the customer to pick a fabric type and color, and manufacture an article of clothing that is specifically tailored to a single user. For obvious reasons, this process may be limited because the customer must be physically present, at least at the measuring stage, to facilitate apparel customization.

Present customizable good manufacturing systems may still suffer from an unacceptable (and wasteful) "lag time" between design and production. There may be some time wasted on the "back end" or manufacturing side of this process. For example, the manufacturing plant may not get the order immediately. This process may only allow customization of apparel to a small extent, and may take an excessive amount of time to complete the article of clothing.

The advent of electronic commerce ("e-commerce") over the Internet is quickly changing the way traditional businesses buy, sell, and advertise their goods and/or services to the public. As more consumers become connected to the Internet using a software web browser or other connection method, the possibility for consumers, designers, and manufacturers to interact directly is increasing at a rapid

pace. Therefore, business models should evolve to take advantage of the various economies of scale and low overhead associated with Internet sales.

Because a consumer's choice of apparel, especially headwear and accessories, may change frequently and may be unique from user to user, it may be desirable to establish a method and apparatus for allowing a user to interact directly with a designer to design a product that is uniquely suited to an individual. The designer may then find a way to interact with an apparel manufacturer on an item by item basis to satisfy the consumer's unique designs. Such a system may be suited for establishment over the World Wide Web.

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SUMMARY OF THE INVENTION

Generally, the present invention comprises an apparatus and method for an integrated product and process for mass customization of goods, one item at a time. More specifically, the present invention comprises an integrated product and process for employing the world wide web in the mass customization of apparel one item at a time. In one embodiment of the present invention, an apparel design system is implemented as part of a World Wide Web site that allows the web consumer to design a piece of apparel based on various styles, types, and embellishments chosen from a selection that exists on the web site. The piece of apparel is then manufactured as part of an integrated process, and the final product is sent to the original consumer/designer.

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In one embodiment of the present invention, the consumer may design a unique piece of headwear from a web-based hat design site. The user may be able to design and customize their own hat by choosing from a variety of styles, fabrics, colors, patterns, and embroidery. The hat is preferably manufactured in an integrated plant according to a process that allows different manufacturing areas or departments to each focus on one specific part of the hat-manufacturing process. For example, the user's web-based design may generate or display a table or master ticket in the plant that defines the specifications for the hat to be manufactured. This ticket may then be passed from fabric cutters, to embroiderers, to sewers, to the packing and shipping department as the hat is manufactured.

Other details, objects and advantages of the present invention will be more readily apparent from the following description of the presently preferred embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention and its presently preferred embodiments will be better understood by reference to the detailed disclosure hereinafter and to the accompanying drawings, wherein:

Figure 1 is an upper level flow chart of an integrated customizable good production system;

Figure 2 shows one embodiment of an initial web page for a customizable headwear design system;

Figure 3 shows a hat-style selection web page as part of a customizable headwear design system;

5 **Figure 4** shows a hat customization web page as part of a customizable headwear design system;

Figure 5 shows a hat customization web page as part of a customizable headwear design system;

10 **Figure 6** shows a web page as part of a customizable headwear design system;

Figure 7 shows one possible embodiment of a master ticket for the crown or cover of a baseball cap;

Figure 8 one possible embodiment of a master ticket for the visor of a baseball cap;

15 **Figure 9** shows a flow chart of one embodiment of an integrated hat manufacturing process; and

Figure 10 shows a shipping label that may be generated as part of the present customizable headwear production process.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention broadly contemplates an integrated device and method for customizing a good to a user's specification and manufacturing that good for the customer as part of an integrated process, preferably in a reduced amount of time as compared to traditional processes. According to FIG. 1, the integrated customized good production system 3 may be split into a design process 5, where the consumer designs a customized product in a web-based factory, and a manufacturing process 7, where a factory or other facility manufactures the good to the user's specification.

The design system 5 preferably exists as one or more web pages or web page applets as part of the World Wide Web (the "web") portion of the Internet 6. A user logs onto the system 5 from any computer or other device that is capable of accessing web pages by typing the web site's (or a related web page's) Uniform Resource Locator (URL) address into the web browser or other software.

Once logged onto the system 5, the user preferably enters a web page where the user is presented with a graphical and/or textual description of a basic version of a customizable good. The user is then able to navigate through a series of choices or decision trees on the web page (or through a series of web pages) using a mouse, keyboard, or other electronic selection device. As the user selects and modifies different choices, the "basic version" of the customizable good is preferably updated to reflect the additions and modifications selected by the user. In this way,

the user can view the good in detail before deciding whether to buy the good. Preferably, the picture of the user-customized good is a photographic quality image of the good, as opposed to a cartoon-based representation of the good. Specifically, digital photographs of the different customizable features of model goods are input
5 into the web-based design system, and the picture of the user-customized good is a "pasted" collection these digital images.

If the user decides to purchase the customized good, a master ticket or some other printout or display of the specifications for the user-designed good is preferably generated at a manufacturing plant 7 that produces goods of this type. This
10 generation or display may preferably occur almost immediately after payment by the user. The master ticket may also have the specification information barcoded onto the ticket, and workers at the various stages of production may be able to scan this barcode to more easily determine the best course of future action. The barcode may also be linked to the manufacturer's accounting system and automatically update
15 certain accounting conditions during production and shipping.

The manufacturing process 7 of the customized good is preferably broken up into discrete production units that each specialize in a certain facet of good production. Materials pickers, assemblers, quality control specialists, and shippers may all focus on one particular task or customization feature, and the customized
20 good may move from production group to production group during manufacture. The goods may also be sorted or "batched" at various stages of production to streamline the manufacturing process 7. Additionally, since the goods are custom-manufactured, the factory inventory may preferably only be comprised of raw materials (such as

bolts of fabric or yarn) rather than pre-assembled pieces or subsections to be put together.

Although this integrated customizable good production system 3 is adaptable to a variety of different goods, it may be well suited to the apparel industry. Because apparel tastes, including accessories and headwear, vary from person to person, the present web customization system 3 may be preferable. Such a system 3 may better keep up with current fashion trends than conventional apparel-making processes. To aid in the understanding of the present system 3, a detailed example will be given below. The example follows the design 5 and manufacture 7 of a customizable hat through the use of an Internet-based design factory 5 and an integrated manufacturing plant 7. The hat system 3 is presented by way of example only, and should not limit the scope of the present invention or applicability to other goods or industries in any way.

Users of the web-based hat design system 5 may design their own individual headwear, built from the materials they choose, in the style they want, in the colors of their liking. Embroidery designs may be selected (if desired) from a select list of fine graphic artists.

Logging on or connecting to the hat design web site or system 5 will preferably take the user to an initial web page or applet 10 (FIG. 2) reminiscent of a factory. The web page's color scheme and graphics may be geared toward a construction or factory-type setting. The web page 10 may preferably present the user with various combinations of hat styles and colors to get the user more interested in designing and purchasing their own hat.

The web page 10 may preferably present the user with various choices to learn about the hats or hat-making process, to receive help on using the hat-designing system, to begin the hat designing process 14, to learn more about the artists and designers of the embroidery for the hats 16, or to solicit new art for hat embroidery 18. The user may begin the hat design process by selecting a button or other link 14 with their mouse or keyboard.

The customizable hat design process preferably consists of presenting the user with one or more questions to answer about the style, colors, design, and/or embroidery to be added to a user-designed hat. Preferably, the different choices are presented to the user or web consumer on the web page in the form of various selectable buttons, pull-down menus, radio buttons, or some other interface from which the user can choose different hat features. The display may also preferably show the different possibilities of the hats to be chosen or the selections as they are made by the user.

For instance, when the user is prompted to select a style for their hat, the display may preferably show what the different choices of hat styles look like. Likewise, when the hat consumer is prompted to choose one or more colors for different parts of the hat, the display will preferably show the user a preview of what the hat will look like in the chosen color scheme. In this way, the interface may streamline the hat design process by taking the "guess work" out of selecting hat components and features. This may also reduce the number of dissatisfied customers or possible product returns because the user is effectively able to view the finished (or progressing) product before actually purchasing it.

Also, the different web pages, questions, or decisions that are encountered by the user may be linked to one or more "help" or explanation screens that guide the user toward making proper choices. If the user is confused about what is expected from him or her at a certain point, or the user does not understand a particular selection, the system preferably facilitates a quicker or better response to these questions and concerns than conventional "ask the sales associate" scenarios that occur at retail stores. Also, a user may receive better information than is normally obtained through conventional processes because the user may be more likely to ask what he or she thinks is a "stupid question" when talking to a seemingly anonymous computer, as opposed to when faced with a human sales associate.

As shown in **FIG. 2**, the initial web page 10 has a "Design your own hat" selection box 14 that contains a revolving set of pictures 20 that display various styles, colors, and designs of hats available on the hat design system 5. After selecting or clicking on this selection 14 with a mouse or keyboard pointer, the user is preferably presented with a beginning hat-style selection screen 21 (**FIG. 3**).

At this first stage, the user may be asked to select the style of headwear that they wish to build 22. Preferably examples of the different headwear styles 24 are presented to the user in graphical form at the top of the web page 21. The various styles may include a baseball cap 26, a bucket hat 28, an ivy cap 30, a fleece hat 32, a knit hat 34, or any other type of headwear. An almost limitless number of headwear styles 24 may be presented, but it may be preferable to only offer hat styles 24 that can be embellished or customized in a variety of ways and can be manufactured in a fairly streamlined process.

After the user selects a style 24, for example a baseball cap 26, the customized hat design system 5 preferably presents the user with a web page 50 that shows a large picture of the chosen style 52 (in this case: a baseball cap) surrounded by various selections to modify or add embellishment to the baseball cap 52 (FIG. 4).

5 For example, along one side of the web page 50, there may preferably be a list of the various steps 54 in the process for designing the style of headwear 52 selected. These steps 54 may change based on the different styles that are selected. These steps 54 may generally be broken down into the various parts of the chosen headwear 52 that may be customized by the user.

10 For example, for a baseball cap 52, the steps or major customization areas 54 may include the crown 56 (half-sphere at the top of the cap), the visor 58, the eyelets and buttons 60, sizing and backstraps 62, embroidery and logo 64, and review and checkout 66 (see FIG. 4). When the user is first presented with the chosen baseball cap 52, the first step 56, modifying the crown, may be pre-selected by the
15 system 5. Below the picture of the cap 52 (or in any other place on the web page 50), the various possible customizations 70 of the crown 56 of the baseball cap 52 may be presented to the user. For example, the crown 56 may preferably be altered by crown shape 72, fabric type 74, fabric color 76, and stitch color 78. As the user modifies the various crown customization attributes 70, another area of the same web page 50
20 preferably presents the user with additional information about the attribute 70 or a graphical sample of the different possible selections 70.

For example, when the user selects or is prompted to customize the shape 72 of the crown of the baseball cap 52, the hat design system 5 may preferably present the user with the choices of a high crown 82, a low crown 84, or an

unstructured crown 86 that has no firm shape. These choices 82, 84, 86 may be accompanied by pictures of each of the choices and may be presented to the user on the same page 50 with the user-designed baseball cap 52. When the user selects a particular crown shape 82, 84, 86, the user-designed baseball cap 52 in the middle of the web page 50 will preferably change in response to this selection 82, 84, 86. If the user does not like a particular selection 82, 84, 86 he made, or if the user merely wants to see another alternative, the user may only need to mouse click or select an alternate crown shape 82, 84, 86. Upon making a new selection 82, 84, 86, the large, user-designed hat 52 will again change to reflect the new change.

As described above, the crown's fabric 74, fabric color 76, and stitch color 78 may also be customized by the user. As shown in FIG. 5, selecting to customize the fabric 74 may present the user with the choices of chino 90, brushed cotton 92, tent canvas 94, washed-out denim 96, brushed bull denim, corduroy, pro style wool blend, 1930's wool flannel, or some other type of fabric. To aid in the user selection process, a graphic or picture of the various types of fabric 90, 92, 94, 96 may preferably be presented to the user next to each respective selection. If the number of fabrics (or any other selection choice) is too numerous to show all on one page, the hat design system 5 may preferably present the selections in a scrollable menu 98. In this way, the user may still more easily view and select from all of the possible choices 90, 92, 94, 96 compared to conventional methods. As with the crown shape selection 56, the large user-designed hat 52 in the center of the web page 100 will preferably change in response to a user selection. The user can "try out" all of the fabrics 90, 92, 94, 96, or select a fabric type and move on.

With reference to **FIG. 4**, the user may next select the color of the crown **76** and the color of the stitching **78** used in the crown. When selecting these color attributes **76, 78**, the hat design system **5** may preferably present the user with a color palette, such as those commonly found in computer graphics programs, from which the user can select from a variety of colors. Color selection **76, 78** is the kind of customization that is very likely to involve trying many different combinations. With the hat design system **5** of the present invention, the user can, preferably in a matter of seconds, view many different combinations of hat colors and styles. Such a system uses the World Wide Web to make headwear (or other goods) more easily customizable than by conventional methods.

The present hat design system **5** may also be preprogrammed to present to the user only those color choices that are actually available for a particular hat combination. For instance, a chino fabric **90** may only be available in certain colors whereas the tent canvas fabric **94** may only be available in certain other colors. As fabric is ordered and restocked or discontinued at the manufacturing plant, the color selections tied to each fabric need only be changed in the web program, and all users or customers will be instantly updated as to the current available inventory of materials. This "online inventory" may reduce the time it takes to manufacture a customized good because there may be no "out of stock" problems.

After making several crown customization decisions, the user may look back over the choices made and decide to change one or more colors **76, 78**, fabric types **74**, or the shape **72** of the crown. If the user is content, the user may then select the second step **58** in the hat-making method: the customization of the visor **58**. The visor may preferably be customizable **58** by fabric type, fabric color, stitching

color, and the number of rows of stitching on the visor. These choices may again be presented to the user at the bottom of the web page (below the user-designed hat 52). Preferably, the user can select these different headwear customizations in a way similar to that described above with respect to crown customizations 70. Again, selecting the different customizable visor attributes may bring up pictorial and textual selection choices that explain to the user how the various customizations will alter the hat 52. After each selection is made, the user-designed hat 52 may preferably be updated to reflect that change.

The third hat-making step 60 down the side of the web page 50 may be to customize the eyelets and button 60 on the baseball cap 52. This selection 60 may allow the user to customize the type and number of eyelets, the color of the eyelets, the button fabric, and the color of the button. The eyelet choices may preferably be between fabric or brass buttons and may allow the user to customize the number and positioning of the eyelets. If a fabric eyelet is selected, the user may also customize the color. Again, as these choices are selected, the user-designed baseball cap 52 shown on the web page is preferably updated to reflect the choices.

The fourth step 62 may allow the user to customize the sizing and/or backstraps of the baseball cap 52. First, this selection 62 may offer the user the choice between a fitted or an adjustable baseball cap. If a fitted cap is chosen, the user may preferably enter a hat size into the hat design system 5 via some selection device. If an adjustable hat is chosen, the user may choose between a VELCRO™, belt buckle, clasp buckle, or some other type of closure. The user may also select from various fabrics, plastic, or a leather enclosure.

The fifth and final substantive hat customization step 64 may allow the user to customize the embroidery and logos that appear on the hat 52. The hat design system 5 may preferably have selections of embroidery art and logos from various artists cataloged by artist or by art genre. Preferably, the art presented to the user is
5 cycled or changed at various times so that the hat design system 5 can change with current fashion trends. Far from the six to nine month lead time common in conventional hat-making processes, the present web-based hat design system 5 may be able to follow even short-lived trends because the hats are made to order. As soon as new embroidery and/or logo art is available and scanned into the web-based
10 system, the art can be made part of a user-designed hat 52.

Some of the art may preferably be logos used by the company running the hat design system 5, but other art may be solicited from professional artists -- either locally, nationally, or internationally. This solicitation may occur directly on the web-based hat design system. Logos of famous brand name apparel-makers may
15 be licensed for use on the hat design system 5. Local or amateur artistic talent may also be solicited and added to the system 5. It may even be possible to have the user modify the embroidery design or colors of the design.

The above selections may complete the hat design process 5 for a baseball cap 52. As stated above and as shown in FIGS. 3, 4, different hat styles 26,
20 28, 30, 32, 34 may have different selection steps 54 and may further have different choices of sub-styles, colors, and/or fabrics within each step (generally 70). For example, a knit hat 34 may only ask the user to customize the style, color, and embroidery and logos that appear on the hat. This type of hat 34 has few features, but may be constructed in a variety of ways. Therefore, there may preferably be fewer

selection steps 54, but there may also be more choices within each selection step 54. A knit hat 34 may come in a dozen or more styles including monk, champ, and pentathlon. The fleece 32, ivy 30, and bucket 28 hats may likewise have different customizable features. However, all of the different styles 26, 28, 30, 32, 34 and design choices will preferably be presented to the user in an easy to use, organized manner.

It is preferable that as many of the above selection choices be presented to the user at the same time as possible. At no time should a customization selection be more than a few mouse clicks or keyboard strokes away from the current area of the hat design web page. In this way, the user may more easily and more efficiently customize his or her hat 52 than by conventional processes. The user may change his or her mind repeatedly during the hat design process 5. As new choices are made, old choices can more easily be revisited and reselected or changed. This type of organized navigation within the web design system may use the World Wide Web more efficiently than conventional web-based purchasing methods.

Also, the hat design system 5 of the present invention may preferably show an "actual" picture of the designed hat 52. Rather than presenting the user with an illustration or a cartoon-like picture of the hat, the hat design system 5 will preferably have photographic quality pictures of actual hat features, colors, and fabrics. In this way, the user is able to make a more informed selection of hat design choices which may reduce the instances of customer disappointment with the resulting hat. The high quality images may also allow the user to "feel" the fabric before purchase by accurately presenting the texture of the fabric through the picture.

The final selection step 66 offered on most of the hat design web pages (regardless of hat type chosen) may preferably be a "review and checkout" step 66 (see e.g., FIG. 4). Now that the hat 52 is fully designed, choosing to "checkout" 66 preferably brings up a new web page 120 (FIG. 6) displaying the final graphical (preferably scanned photographic) version of the hat 52. A list of the user-selected features 122 may also be presented to the user as part of the review and checkout page 120. This list 122 may be reviewed by the user to make sure that he or she still desires a hat 52 with the selected features. If any feature or other attribute 122 is no longer desired, the user may select any of the previously visited selection steps 54 and re-design or modify their hat 52. If the user is happy with the hat 52 as designed, they may choose to save the hat to a disk, an Internet shopping cart 124, or some other storage or e-commerce device or method for saving selected information until a sale is made.

By saving the design to the shopping cart 124, the design factory web page or applet 120 is preferably closed and the user is returned to the main web browser screen. This screen may show the current contents of the user's shopping cart, or some other indication of the user's purchase choices up to this point in time. Again, the user selections are preferably presented in a list or other form. Also, the price of the headwear as customized and the estimated shipping cost are preferably presented to the user. At this point, the user may still choose to further modify the hat, to save the hat as designed to decide later whether to buy the hat, or the user may elect to purchase the hat at this time.

If the user selects to purchase the hat, some contact information is requested as well as some sort of payment. This payment may be in the form of a

credit card payment, an Internet banking transfer (such as web cash), or any other electronic form of payment. If the user does not want to send payment over the Internet, the user may also decide to print out an order form with the user-defined hat specifications, and mail the order form with a check, money order, or some other
5 form of payment to the administrators of the customized hat (or other good) production system 3. In some way, however, the payment should be either received, pledged, or guaranteed before the hat manufacturing process 7 commences.

The above user hat design process 5 was described with respect to a series of choices and selections to be made in response to information presented to the
10 user as part of a web page over the World Wide Web. It should be noted here that this particular presentation, and the particular information requested, design choices made, or hat types offered, were presented by way of example only and are not intended to limit the scope of the invention in any way. The above design system 5 (as well as the integrated manufacturing process 7 described below) are applicable to
15 the customization of apparel generally, as well as to the customization of many other goods.

To make the hat design web site 5 more fun and easy to use, and to allow for a quicker purchase selection, there may be additional features to help the hat designer have a more enjoyable and productive experience. For example, the hat
20 design web site 5 may have a randomizing device that produces a randomly-designed hat from all of the possible choices of hat designs, styles, and colors. When selected or otherwise presented to the user, the randomizing device will arbitrarily choose a hat type and then successively randomly select additional features, colors, and/or logos and embroidery with which to customize the hat. The user may then select the.

random hat for purchase, or the user may use the random hat as a starting point for designing his or her own hat. This randomizing device acts as a type of information and idea base to help the user get ideas for designing their own hats. With reference to **FIG. 2**, the hats created with the randomizing device may be presented to the user
5 as part of the initial web page **10**, for example as part **20** of the "Design your own hat" box **14**.

Also, the hat design web system **5** may have one or more selectable archives such as a hat-of-the-month club. Selecting or choosing a link to the hat-of-the-month club may preferably produce a picture or list of the most commonly
10 purchased hats or general style of hats from the last month or other time period. The user may be able to click on any of these popular hat styles and either purchase that particular hat or use that hat design as a starting point for designing and customizing their own hat.

Also, the web-based hat design system **5** may allow the user to e-mail
15 a particular hat design to another person. For example, the hat design system **5** may assign a unique hat identification number to each hat that is designed or built. This identification number preferably allows the user to save the hat design and buy it during a later Internet session. This same information could be e-mailed to another person so that they can view and buy the same hat as the first designer. Several
20 people could purchase identical hats as part of a group, or each member of the group could customize their own hat in a unique way. This functionality allows groups of people to design and customize similar hats without going to the same retail store or being in the same city, state, or even country.

Finally, the above hat design system 5 (or some other customizable product system) may further be refined by "pre-screening" users who come to the site by virtue of specific hyperlinks. For example, a college or university web page (or the web page of a student attending a particular college or university or even a business) may have a link to the hat design web system 5. When a user enters the hat design system 5 through that hyperlink, the user may also carry pre-screening information to narrow down the hat selections. In one case, the system may "pre-select" hat design color schemes that are related to the school colors of the college or university. In another case, the various logos or emblems associated with that particular college or university may be the embroidery or logos that are able to be selected for the hat design for a user who enters the hat design system 5 through that particular college's hyperlink. In this way, the hat design system 5 may be further customized.

With various links in various genres channeling users with different interests, the web-based hat design system 5 may preferably be presented to users as a series of different stores with different choices based on the users pre-defined preferences. The hat design system 5 may appear more like a themed hat store rather than a general purpose hat design site. In all of these instances, however, the hat design system 5 may still offer the user the possibility of customizing their hat. The channeled choices may just be preferred selections.

Once the user has designed his or her hat 52 (or any other customizable good), the integrated hat production system 3 preferably generates or displays a ticket or qualifying order printout that lists all of the features of the user-designed hat 52. This display or generation may preferably occur almost immediately.

after the user pays for the hat. This ticket will preferably contain all of the information necessary to build the user-designed hat 52. The ticket may also have a barcode on it that has encoded information about the user, the price of the hat, the specifications of the hat, and the flow of the hat throughout the integrated hat manufacturing plant 7.

As the hat is progressively manufactured, the barcoded master ticket will preferably be tracked, and information about where along the manufacturing process the hat currently resides is saved in a computer system. When the hat is completed and ready to be shipped, this barcode information may also allow the system to directly enter the hat as a sale into the manufacturer's accounting system. Additionally, this barcode information about the hat order may be used to automatically print out the proper address label and other information for a shipping company shipment to the buyer.

The integrated manufacturing process 7 is preferably compartmentalized so that each production unit specializes in one particular area of apparel-making (in this case: hat-making). For example, there may be a production unit that specializes in gathering the necessary materials. There may be a production unit that specializes in cutting the fabric for the hat. There may be production units that specialize in adding the embroidery and/or logos to the hat, sewing the materials together, and/or packing and shipping the boxes of hats to the consumer. Preferably, the flow of the different steps and the information necessary to perform each of these steps is encoded on the ticket's barcode and/or printed on the ticket in some other manner.

In one embodiment of the present invention, a master ticket or tickets are printed at the manufacturing facility 7 in response to the user selections for a specific baseball cap in the web-based design system 5. FIG. 7 shows one possible embodiment of a master ticket 130 for the crown or cover of a baseball cap, and FIG. 8 shows one possible embodiment of a master ticket 160 for the visor of a baseball cap. The crown or cover master ticket 130 (FIG. 7) preferably details all of the different features of the baseball cap, with emphasis on the features pertinent to crown construction. For example, the ticket 130 may detail the cover style 132, fabric type 134, fabric color 136, and stitch color 138. The cover ticket 130 may also detail user selections about the buttons 140, eyelets 142, logos 144, embroidery 146, backstrap 148, and/or any other features that may be associated with the baseball cap cover or crown. Although not necessary to constructing the cover, the cover ticket 130 may also detail visor-related user selections 150. These additional selections may help factory workers organize or "batch" the hats during construction according to common characteristics.

The cover ticket 130 may also have one or more barcodes 152 that electronically hold information about the hat to be manufactured. For example, there may be a main barcode 152 that contains information about the hat, the customer, or other aspects of the hat-making process. At any point in the manufacturing process 7, an employee may scan this ticket barcode 152 to find out information about this particular hat job, its customer, or anything else related to this job. Additionally there may be an embroidery barcode 154 that electronically contains information about the type, design, size, color, location, and/or other attributes of the embroidery for the custom-designed hat.

As shown in **FIG. 8**, there may also be one or more additional tickets, such as a visor ticket **160** produced in response to a user's choice to purchase a custom designed hat. This visor ticket **160** may contain information related to visor manufacture such as the fabric type **162**, fabric color **164**, stitch color **166**, and/or number of stitch rows **168**. Although all of the relevant hat information may be included on one ticket, having multiple tickets may speed up the manufacturing process **7** by allowing one production group to begin constructing the crown of the cap while another, parallel production group constructs the visor. At some later production stage, these two assemblies may meet and one hat may be produced. The second ticket **160** may also have information about the cover **170** and eyelets **172** for batching purposes. There may also be one or more barcodes **174** to aid in following hat production and to provide further information.

Through many stages of hat production, it may be appropriate to "batch" or organize the progressing hats according to some common feature. In this batching process, a rack is preferably provided that includes multiple slots or areas to hold the material bag and/or hat (depending on what stage of production the hat is in). Every slot may represent a common hat characteristic, for example, hats with a specific crown color. Hence, all of the (future) brown hats would be grouped together, all the future blue hats would be grouped together, etc. In this way, the employees of the next production unit may more easily accomplish their tasks. All of the hats with a similar characteristic may be worked on in succession, and only after all of one type of hat is finished will the employee move on to the next type of hat. In performing one task repeatedly until the batch is completed as opposed to alternating between two or more different tasks, the employee may work more efficiently.

Once the master ticket or tickets 130, 160 are generated at the manufacturing plant, the hat manufacturing process 7 is ready to begin. FIG. 9 shows a flow chart of one preferred embodiment of an integrated hat manufacturing process 7 as part of the present invention. All of the master tickets generated in a given time period (e.g., a day) may be summarized on a master sheet of materials which lists all of the fabric that needs to be cut to fulfill those orders.

The cutter 200 preferably cuts the fabric to the proper size and shape to make the hat according to the master sheets (or master tickets). The cutter may scan the ticket and receive information about the number of caps ordered, the style of cap, the fabric type, the fabric color, and the hat size. This and other information may be used by the cutter to determine what types of fabric must be cut and the size and shapes of the cuts to efficiently produce the ordered caps. Rather than cutting fabric to a specific shape, the first production unit may also knit yarn into a desired fabric pattern. This type of fabric production may be appropriate for the knitted hats to be made in the customized hat production system. After cutting, the pieces of fabric are preferably matched to a corresponding master ticket, and the ticket/fabric combinations are batched according to "mono (monofilament) type" 210.

A "pre-production" unit may receive the fabric and ticket next. Here, a pre-production specialist may scan the ticket to determine the proper course of action. Preferably, the pre-production unit will gather or "pick" all of the materials required for the production of the hat. These materials may include thread, embroidery or logo designs, backstraps, eyelets, buttons, and/or other embellishments. The pre-production unit preferably puts all of the necessary materials into the fabric bag. If not already done, this unit may then batch 210 the order by mono type -- the type of

backing or lining that the hat may have supporting the crown. Another production group may accept these batched orders and attach the appropriate mono type to the hat 220.

5 The "crowns" may preferably be sorted next by eyelet color 240. The eyelets may then be cut and/or sewn into the crown of the hat 250 according to the directions on one or more of the master tickets. Because of the batching 240, one employee may concentrate on metal (versus fabric) eyelets, and other employees can sew thread eyelets by color. After eyelet production, the hats are preferably batched according to cover (crown) stitch color 260.

10 While the crown production may take one route through the factory, the visor production may take a second route 230. For example, a second "visor" ticket may be produced, and these visor orders may be batched by visor color. These batched orders may then be sent to a visor material cutter to cut the appropriate color, size, and type of material for the visor. The cut visor materials may preferably be
15 placed in a bag and batched by visor stitch color. This batch may then be sent to a visor sewing production unit that sews the appropriate visor together. The "completed" visors may then be put on a rack and batched by some type of crown information 230.

20 At this point, the partially formed crowns and the partially formed visors may be brought together in the hat-making factory 270. This may be facilitated because the visors were batched by some crown-specific attribute. A production unit may sew the crowns and visors together at this point 270, or wait until after more detail is added to the crowns at a later production point. Many of these tasks,

batchings, and production steps are interchangeable, and the particular selection and order presented herein is presented only by way of example.

Next, the hats may be batched according to the existence of, or chosen style of, embroidery to be added to the hat 275. An embroidery production unit worker may then embroider the hat 280 according to the directions on the master ticket. Here, the embroidery style, type, location, or other information may be barcoded on the master ticket separate from the main barcode. This second barcode may facilitate an easier batching process, or may allow the embroiderer to more easily understand what embellishment needs to be added to the hat.

After embroidery, the hats are preferably batched according to logo-related characteristics or other detailing. The logo department may then add a logo or other detail to the hats according to the user's specifications encoded on the master ticket. Next, the hats are batched by finishing style, which may preferably include the type of backstrap to be put on the hat. The finishing department can then sew or attach the appropriate backstrap or closure device to the back of the hat. That hat is now ready to be blocked or heated with steam to form the hat into its final shape. The hats are preferably batched according to the necessary blocking pattern 285, and the blocking production unit preferably completes the hat-making production 287.

After the hat is fully assembled, the master ticket may be scanned again and the hat is preferably sent on to the packing and shipping department 289. In shipping 289, a scan of the master ticket may generate a shipping label 300 -- such as a UPSTM tracking number -- that can be put on the shipping container in which the hat is shipped (see FIG. 10). This scan may calculate the proper shipping fee amount

based on the hat characteristics, and the scan may preferably save or log the shipping number, dates of projected shipment, and other information that the user or manufacturer may be interested in accessing while the hat is being shipped. This final scan allows the shippers to confirm the number of hats in the order.

5 Also, this final scan preferably completes the manufacturing cycle 7. Hence, as the hat is shipped out the door, the scan can alert the manufacturer's accounting system that the manufacturing process is complete, and the accounting software may log this event as a completed sale for accounting purposes. This automatic accounting process update may increase the efficiency and speed that a
10 manufacturing facility can keep track of its inventory and sales. -- thereby again reducing manufacturing time.

 Also, as the shipping label is attached to the carton and the hat is sent out, the final scan may alert the hat design system to e-mail the user or designer of the hat that the hat has been manufactured and is currently being shipped. Also, the
15 system could give information about probable shipping times and a tracking number that can be used by the consumer to "follow" the hat as it is shipped to his door.

 The above description of one possible embodiment of a system for building a hat based on a barcoded master ticket that was produced by a hat design system utilizing the internet to obtain a user's design choices was provided by way of
20 example. Many additional features and functions could be added, subtracted, or re-ordered while still keeping within the scope of the present invention.

Also, the above hat design system was presented by way of example and should not limit the present invention to just a hat-specific applications. This invention may be more generally applicable to apparel (for example, fleece wear, sweatshirts, T-shirts) or to other goods (for example, sunglasses or backpacks) and industries that are customizable. The design system of the present invention, can be used in the customization of many different goods by a user, one item at a time. The user enters the web site, which preferably exists as part of the World Wide Web portion of the Internet. The user is then presented with organized, graphical and textual selections and choices to modify and customize a good to the user's own liking. Then, an integrated manufacturing process takes this customized good and may preferably produce or manufacture the good on a reduced time frame when compared to a traditional manufacturing process. Because the system of the present invention can present various customizable choices that can be manufactured from scratch, the system may be preferable to existing business models.

In at least one preferred embodiment, the present invention may be useful in manufacturing a good from basic raw materials rather than pre-selected, pre-stored parts. By allowing the user an extensive set of customization options, the hat is created from thread, fabric, and/or yarn to knit material from. Because no inventory of previously made hats or hat components need be stored at the manufacturing factory, the factory may more efficiently use its allotted space. Rather than storing partial components, the present customization system may truly custom-build a good from "scratch," and not merely rearrange or assemble pre-made parts that must be stored at the factory until used. The present invention, in at least one of its preferred embodiments, contemplates a true custom-building system, rather than a custom-

arrangement of previously built and stored parts. This system may use up less factory space, minimize the amount of time that goods sit on a shelf at the factory, and streamline the good customization process.

5 Although the invention has been described above in terms of particular embodiments, one of ordinary skill in the art, in light of the teachings herein, can generate additional embodiments and modifications without departing from the spirit of, or exceeding the scope of, the claimed invention. Accordingly, it is to be understood that the drawings and the descriptions herein are proffered by way of example only to facilitate comprehension of the invention and should not be
10 construed to limit the scope thereof.

CLAIMS

WHAT IS CLAIMED IS:

1. A production system, comprising:

a web-based design system, wherein a user can select attributes of a
5 good; and

a manufacturing plant wherein the good is manufactured to include the
attributes selected by the user as displayed by the web-based design system at the
manufacturing plant.
- 10 2. The production system of Claim 1, wherein the web-based
design system comprises a web page that presents the user with a picture of the good,
wherein the picture includes the attributes of the good selected by the user.
3. The production system of Claim 2, wherein the picture
comprises at least one image of a component of an actual good.
- 15 4. The production system of Claim 1, wherein the web-based
design system produces a record of specifications for the good.
5. The production system of Claim 4, wherein the record includes
the selected attributes.
6. The production system of Claim 5, wherein the record
comprises a ticket printed at the manufacturing plant.
- 20 7. The production system of Claim 1, wherein the manufacturing
plant comprises discrete production units.

8. The production system of Claim 1, wherein the attributes presented to the user for selection vary in accordance with the web location from which the consumer was linked to the web-based design system.

5 9. A system for producing hats comprising:

a web-based hat design system that accepts hat attributes selected by a user and displays a picture of a hat including the attributes; and

a manufacturing plant wherein the hat is manufactured.

10 10. The system for producing hats of Claim 9, wherein the user may select a hat from an archive of hat designs.

11. The system for producing hats of Claim 9, wherein the design system includes a randomizing device.

12. The system for producing hats of Claim 9, wherein hat designs may be electronically transferred to another web address.

15 13. The system for producing hats of Claim 9, wherein the picture comprises at least one image of a component of an actual hat.

14. The system for producing hats of Claim 9, wherein the design system further includes a web-based shopping cart to hold information about the hat before the hat is purchased.

20 15. A method for producing a hat, comprising the steps of:

receiving specifications for the hat from a designer through a web-based interface;

accepting payment for the hat;

generating a ticket at a manufacturing plant, the ticket including specification information about the hat;

manufacturing the hat at the manufacturing plant;

5 shipping the hat to a designated address.

16. The method of Claim 15, wherein the ticket includes a barcode.

17. The method of Claim 15, wherein the step of manufacturing the hat further comprises the steps of:

cutting fabric for the hat;

10 adding embroidery to the hat;

sewing the hat; and

blocking the hat.

18. The method of Claim 15, wherein the step of manufacturing the hat further comprises the step of batching the hat by a hat characteristic.

15 19. The method of Claim 16, further comprising the steps of:

scanning the barcode; and

automatically updating an accounting system in response to the scanning step.

20 20. The method of Claim 19, further comprising the step of automatically generating a shipping label in response to the scanning step.

21. The method of Claim 18, wherein the hat characteristic is selected from the group consisting of cover stitch color, eyelet color, mono type, embroidery, and blocking pattern.

1/10

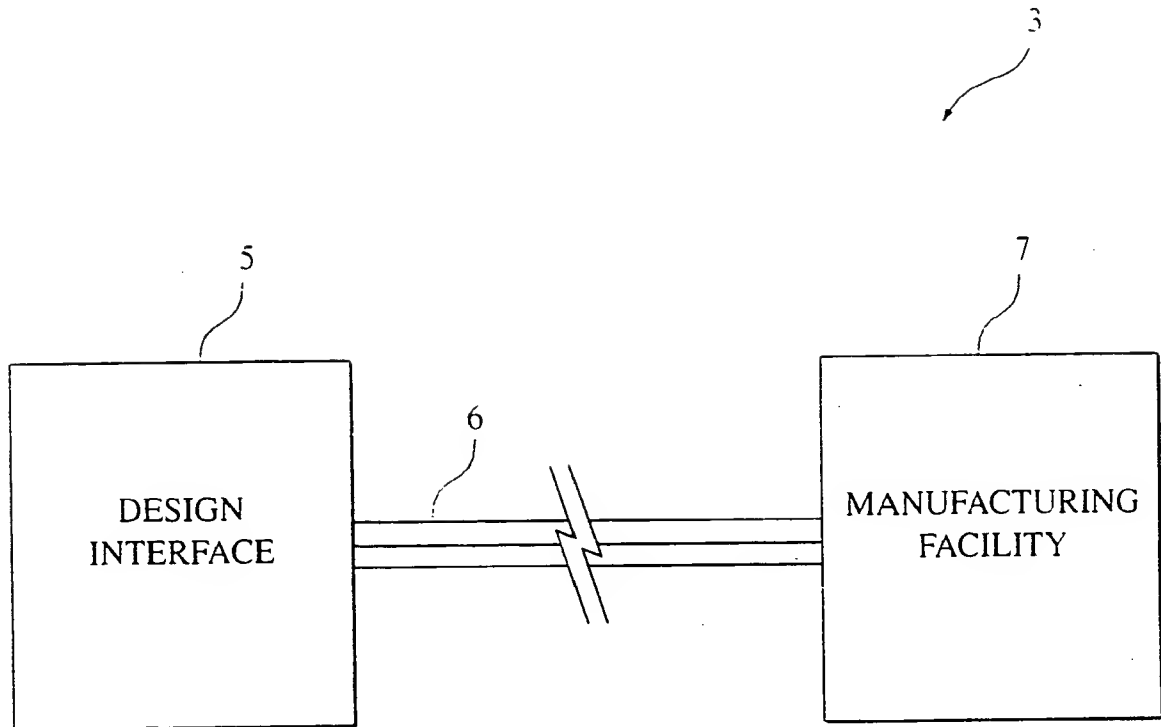


FIG. 1

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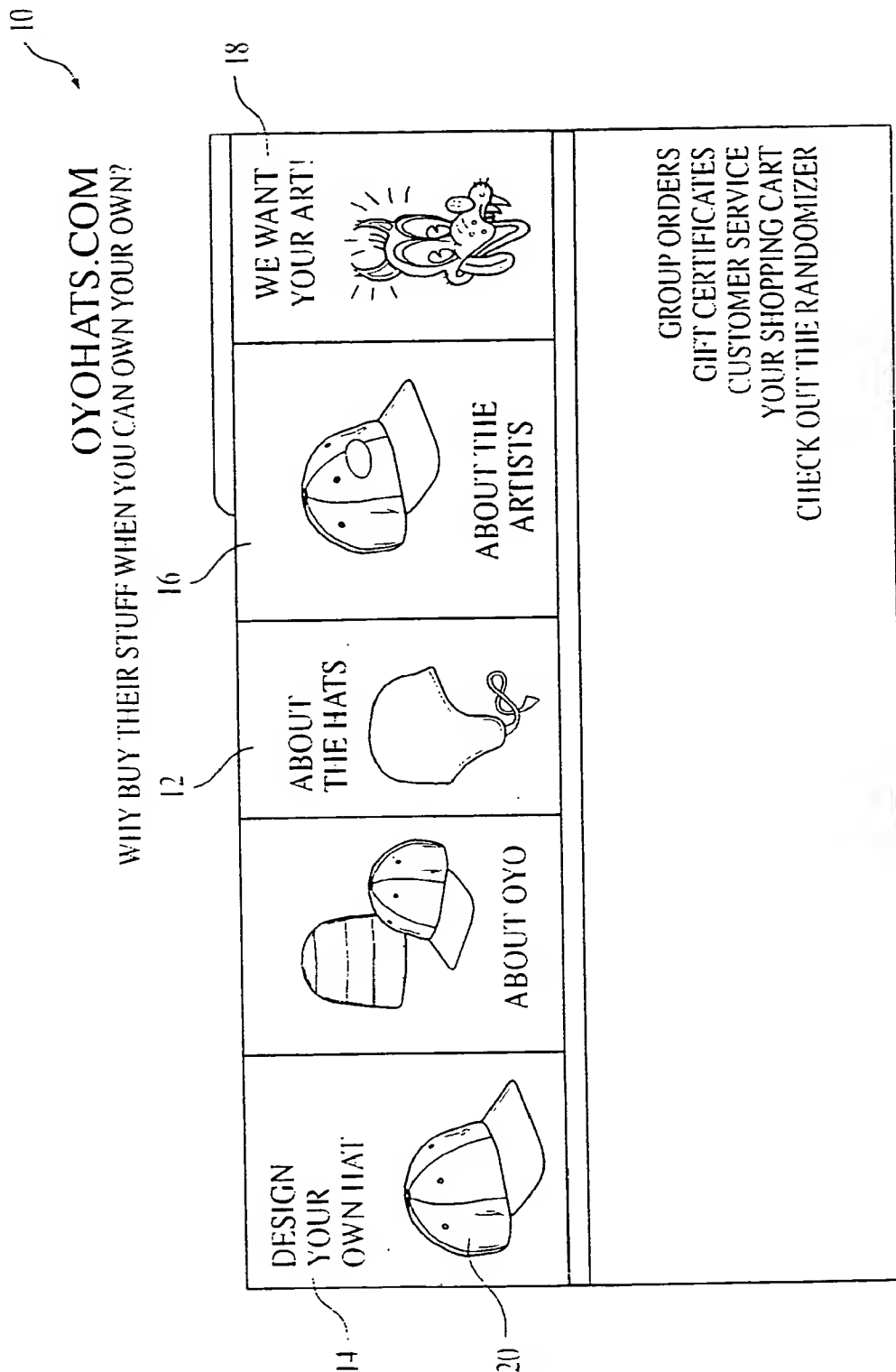


FIG. 2

3/10

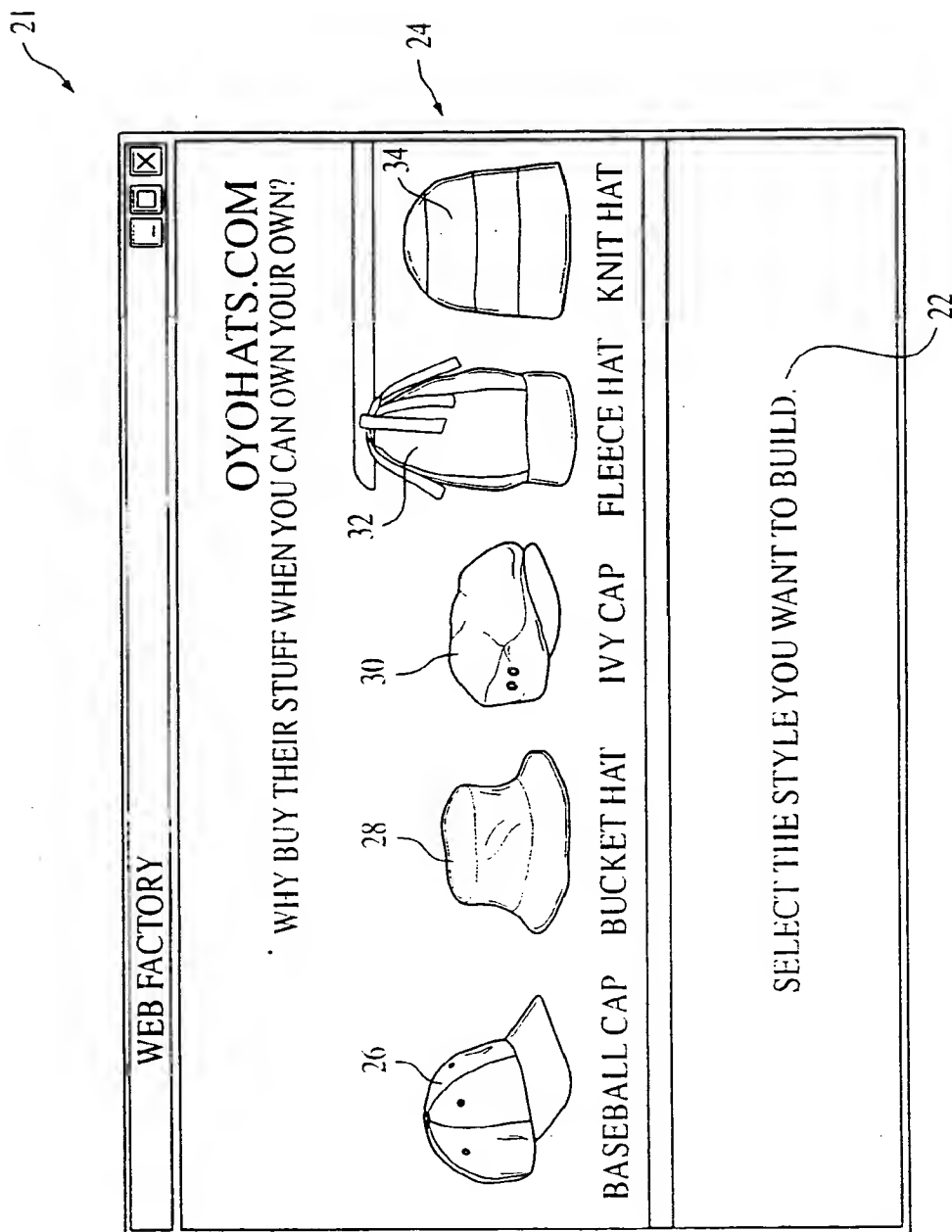


FIG. 3

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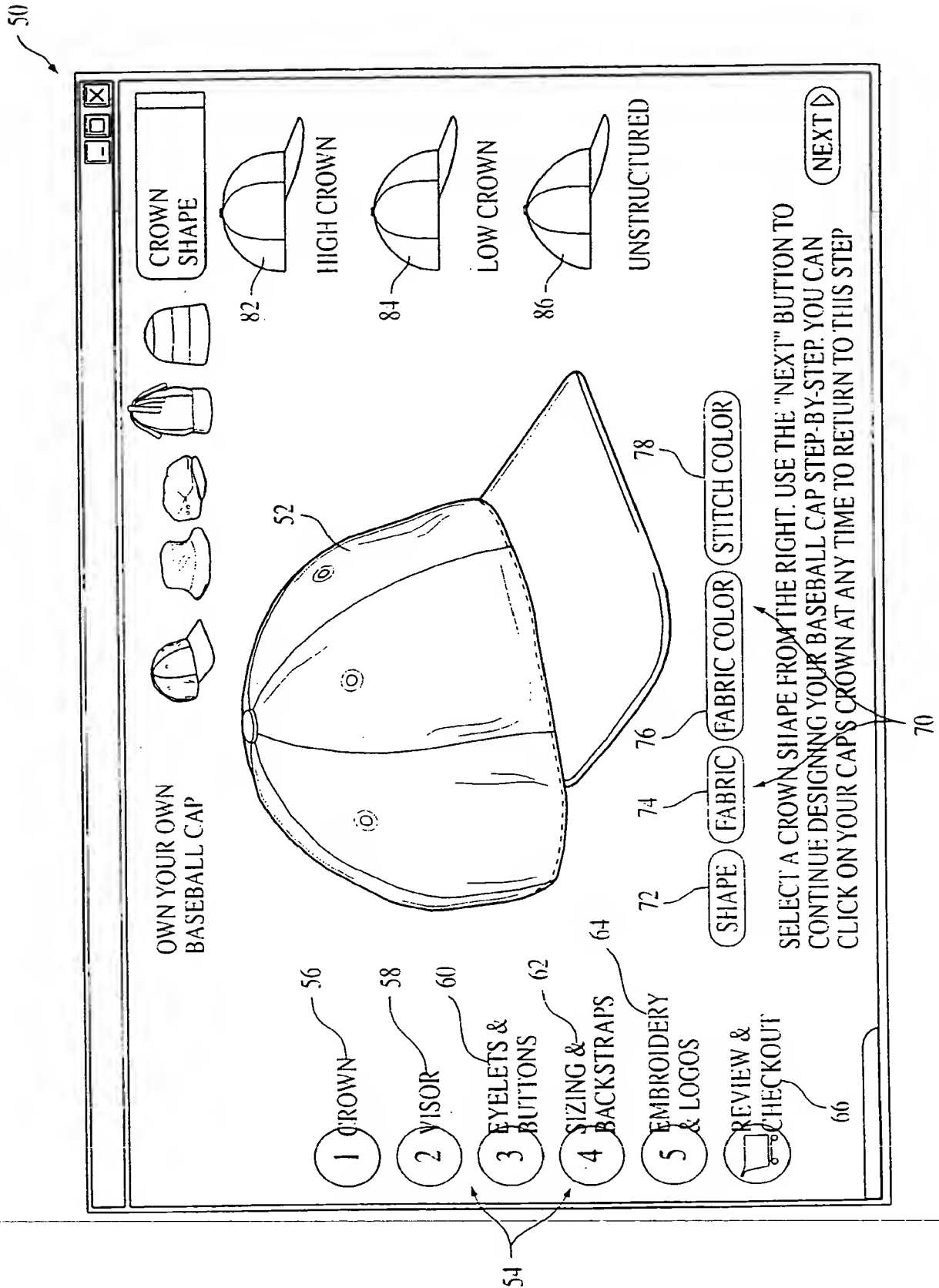


FIG. 4

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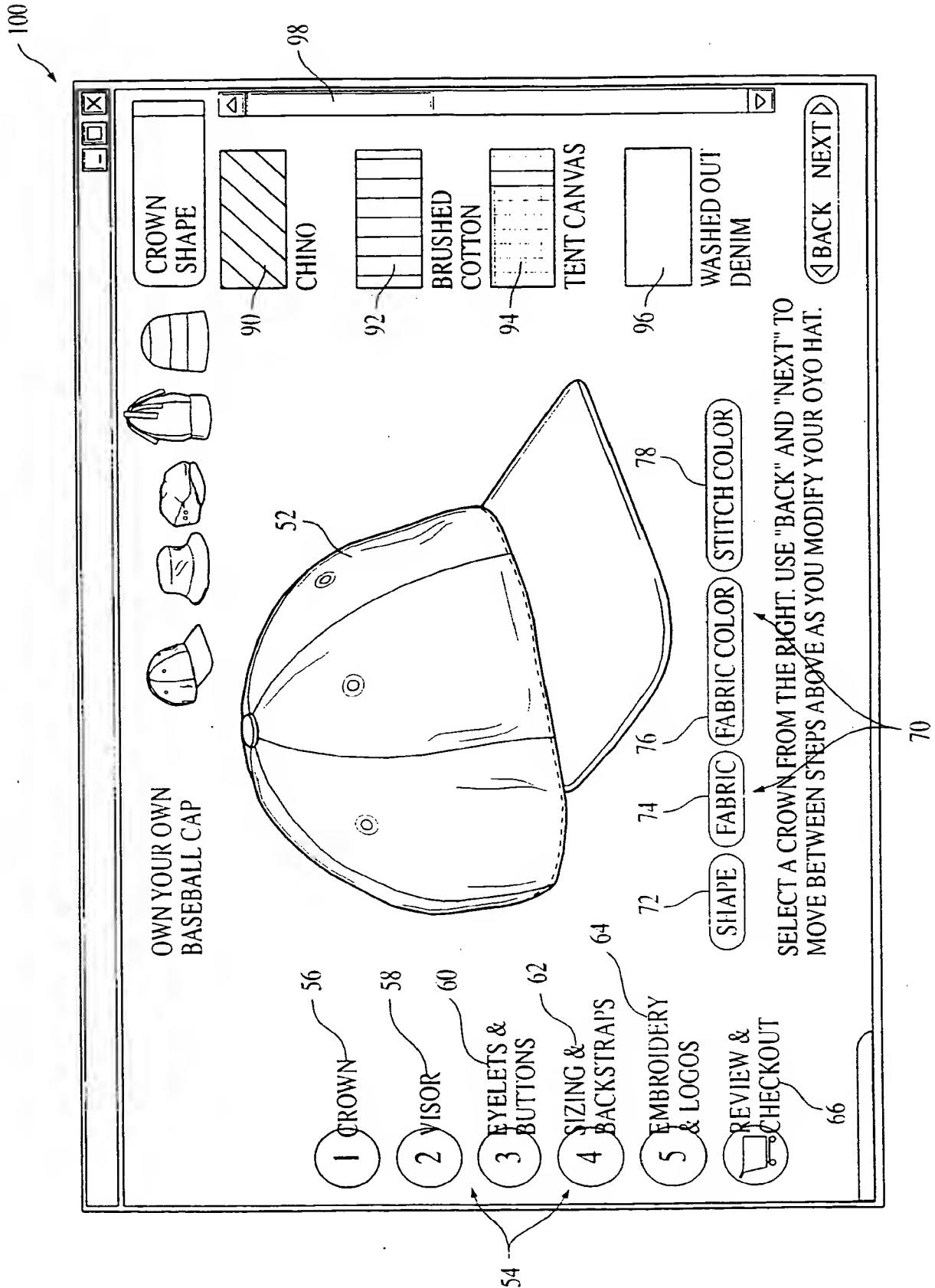


FIG. 5

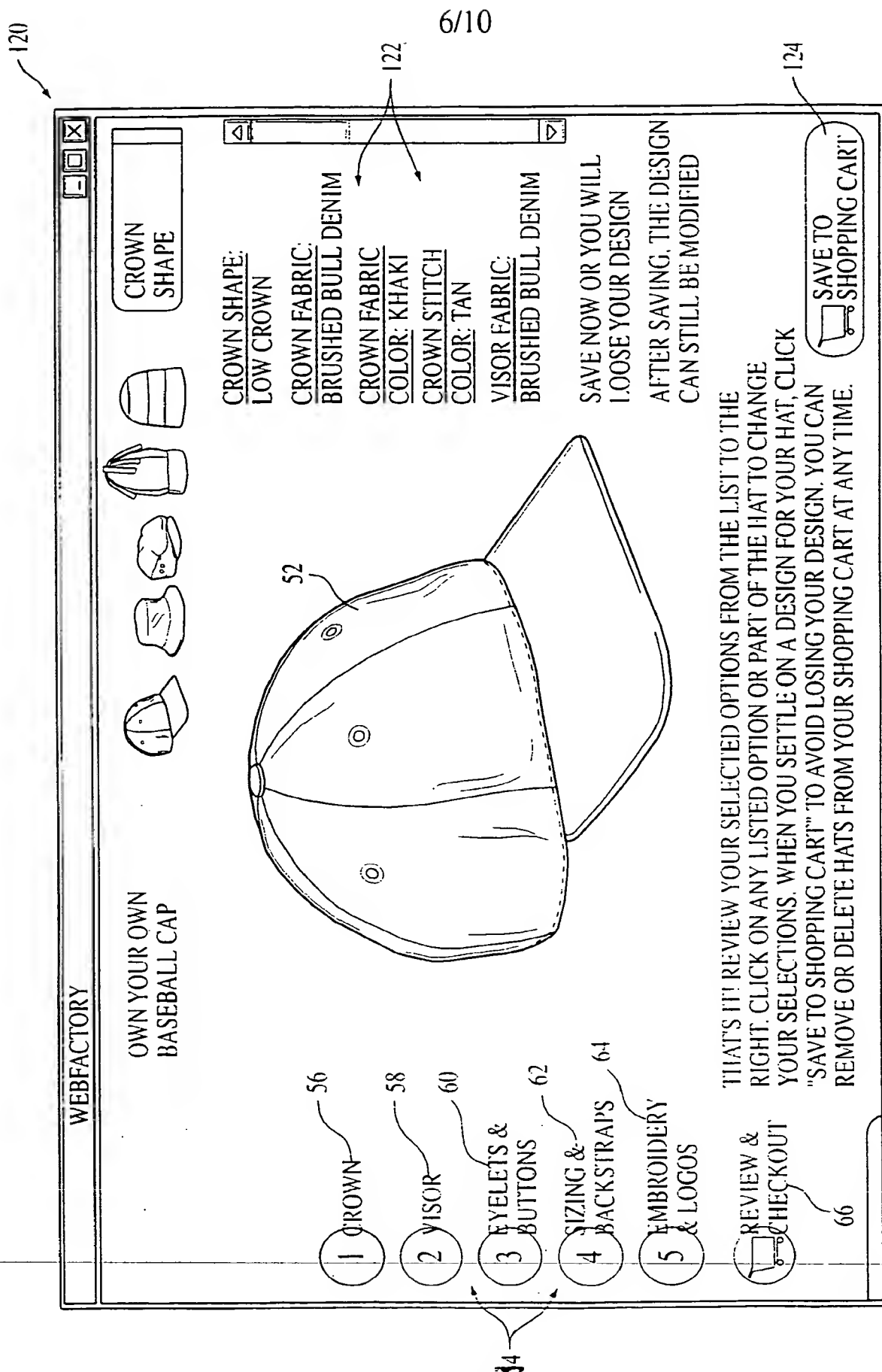


FIG. 6

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130

ADJUSTABLE
BASEBALL COVER

1
QUANTITY

COVER STYLE.....LP97 MONO 132

COVER FABRIC.....PRO STYLE WOOL BLEND 134

COVER FABRIC COLOR.....BLACK 136

COVER STITCH COLOR.....BLACK 138

140 BUTTON FABRIC.....BRUSHED BULL DENIM

BUTTON FABRIC COLOR.....BLACK

142 { EYELET OPTIONS.....6 SEWN EYELETS, MATCHING CROWN

{ EYELET COLOR.....BLACK

144 OYO LOGO COLOR.....NO LOGO

148 BACKSTRAP.....MATCH CROWN W/BELT BUCKLE

146 EMBROIDERY.....000 154

VISOR FABRIC.....PRO STYLE WOOL BLEND

VISOR FABRIC COLOR.....BLACK

01-533066795-0000210 0
SHIP

152 3/25/2000 258

FIG. 7

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160

VISOR COPY

	BASEBALL VISOR	1 QUANTITY
162	VISOR FABRIC.....BRUSHED COTTON	
164	VISOR FABRIC COLORNAVY	
166	VISOR STITCH COLORGUN METAL	
168	ROWS.....2 ROWS	
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">170</div> <div style="border-left: 1px solid black; padding-left: 10px;"> <div style="margin-bottom: 5px;">COVER STYLELP97 NO MONO</div> <div style="margin-bottom: 5px;">COVER FABRIC.....BRUSHED COTTON</div> <div style="margin-bottom: 5px;">COVER FABRIC COLORNAVY</div> <div style="margin-bottom: 5px;">COVER STITCH COLORNAVY 3</div> </div> </div>		
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">172</div> <div style="border-left: 1px solid black; padding-left: 10px;"> <div style="margin-bottom: 5px;">EYELET OPTION6 SEWN EYELETS</div> <div style="margin-bottom: 5px;">EYELET COLORGUN METAL</div> </div> </div>		
<div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="width: 60%;"> <div style="margin-bottom: 5px;">01-533069721-0000212</div> <div style="margin-bottom: 5px;">174</div> <div style="border-bottom: 1px solid black; height: 20px; width: 100%;"></div> <div style="margin-bottom: 5px;">3/25/2000</div> </div> <div style="width: 35%; text-align: right;"> <div style="margin-bottom: 10px;">0 SHIP</div> <div>260</div> </div> </div>		

FIG. 8

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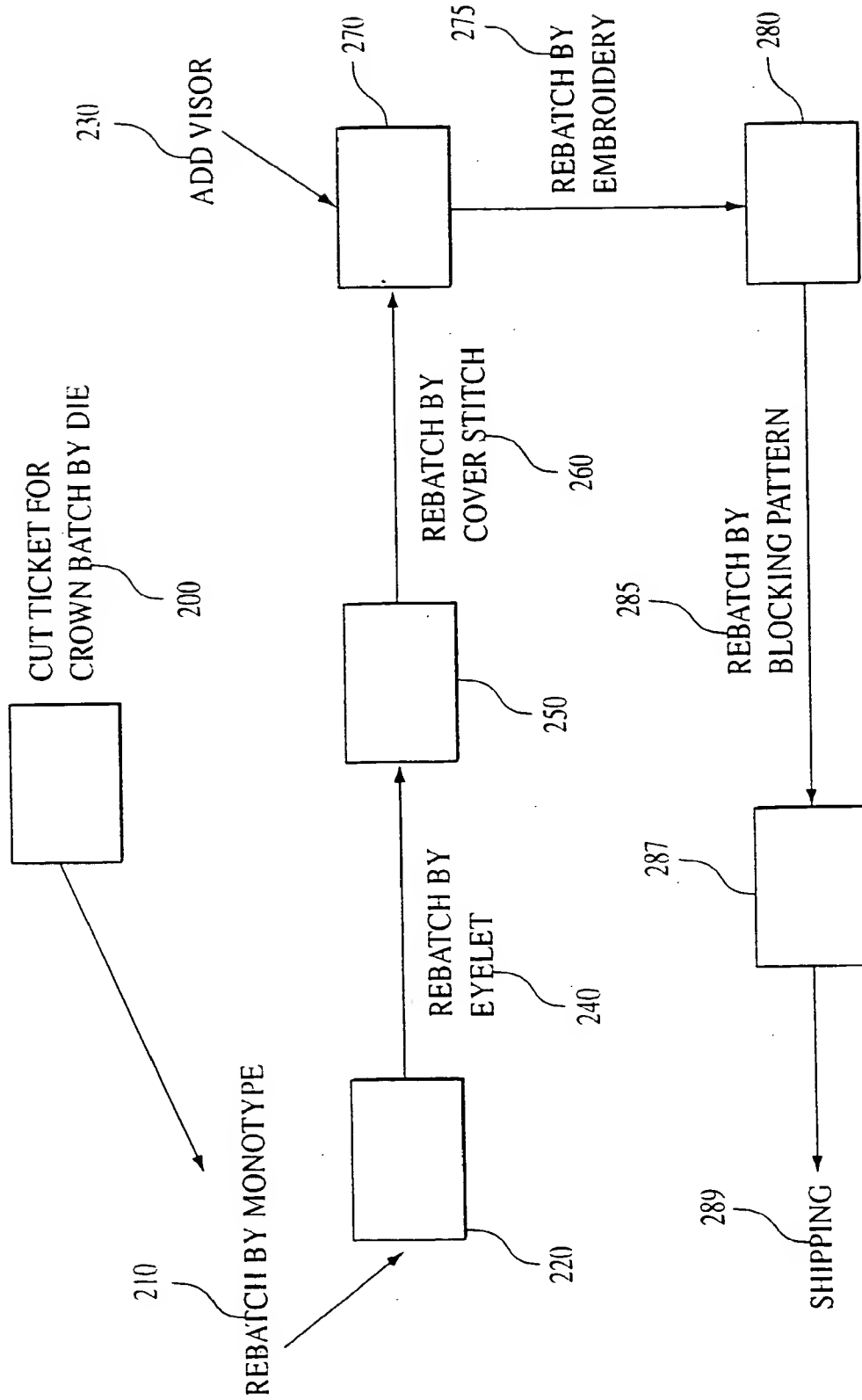


FIG. 9

10/10

300


OYOHATS.COM 1000 TREADWAY CREIGHTON, PA 15030	<u>OYOHATS.COM</u>
1-800-363-7040 ORDERS@OYOHATS.COM	ORDER DATE: 3/25/2000
SHIPPING ADDRESS:	
ROB WILLITS 23380 SE 248TH ST. MAPLE VALLEY, WA 98038	
01-533069721-0000212 	QTY 1

FIG. 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/40015

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/60

US CL : 705/27

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/27, 26

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NoneElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Extra Sheet.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X, P	US 5,983,201 A (FAY) 09 November 1999, col 2, lines 50-60, col. 3, lines 34-66, col. 4, lines 1-3 col. 6, lines 4-34, 42-46, 52-54, 62-64, Figure 1	1-8
Y	Copy Caps Web Page (www.copycaps.com), 1999	9,10,12-21
Y	Internet Mall Attracts Retailers, Oakland Tribune, 16 December 1996, p. C1.	9,10, 12-21
Y	Drizen R., Hats Make Headway, Apparel Industry Magazine, September 1991, p. 65.	9,10,12-21
Y	Markell C., "Do-it-yourself EDI", Apparel Industry Magazine, August 1996, v. 52, n 9, p. 62.	16,19,20
Y	Greco M., "A Flexible Alternative", Apparel Industry Magazine, May 1995, v. 56, issue 5, p. 28.	18,21

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
B earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 06 JULY 2000	Date of mailing of the international search report 04 AUG 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer ALLAN MACDONALD <i>Joni Hill</i> Telephone No. (703) 308-0000

Form PCT/ISA/210 (second sheet) (July 1998)*

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/40015

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Mautner N., "Made-to-Measure Goes Mass Market", Inside Fashion, June 1998, vo. 8, issue 11, p.8	1-8
A	The Right Stuff: America's Move to Mass Customization, Federal Reserve Bank of Dallas, 1998 Annual Report, p. 1-26.	1-21
A	Schonfeld E., "The Customized, digitized, have-it-your-way economy", Fortune, 28 September 1998, p. 115-124	1-21
A	US 4,598,376 A (BURTON ET AL) 01 July 1986	1-8
A	US 3,604,701 A (HAWLEY) 14 September 1971	9-21

Form PCT/ISA/210 (continuation of second sheet) (July 1998)*

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/40015

B. FIELDS SEARCHED

Electronic data bases consulted (Name of data base and where practicable terms used):

West, Dialog, Proquest, Yahoo

search terms: customized, internet, design, manufacture, manufacturing, hat, clothing, headgear, Interactive Custom Clothes Co, Sui Generis, Squash-Blossom, random, randomize, tailor, tailoring